SPECTX

Problems

Manual inspection

Wind turbine inspection done manually is expensive, high-risk and time consuming and cannot detect internal structural defects fast & effectively.

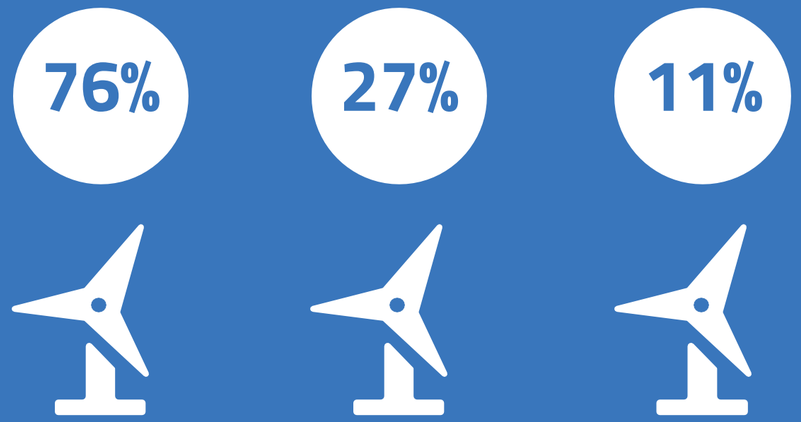
Visual inspection

Alternative drone visual inspection can only detect a limited number of external defects. However, some of the structural defects are not visually detectable externally.

Internal defects

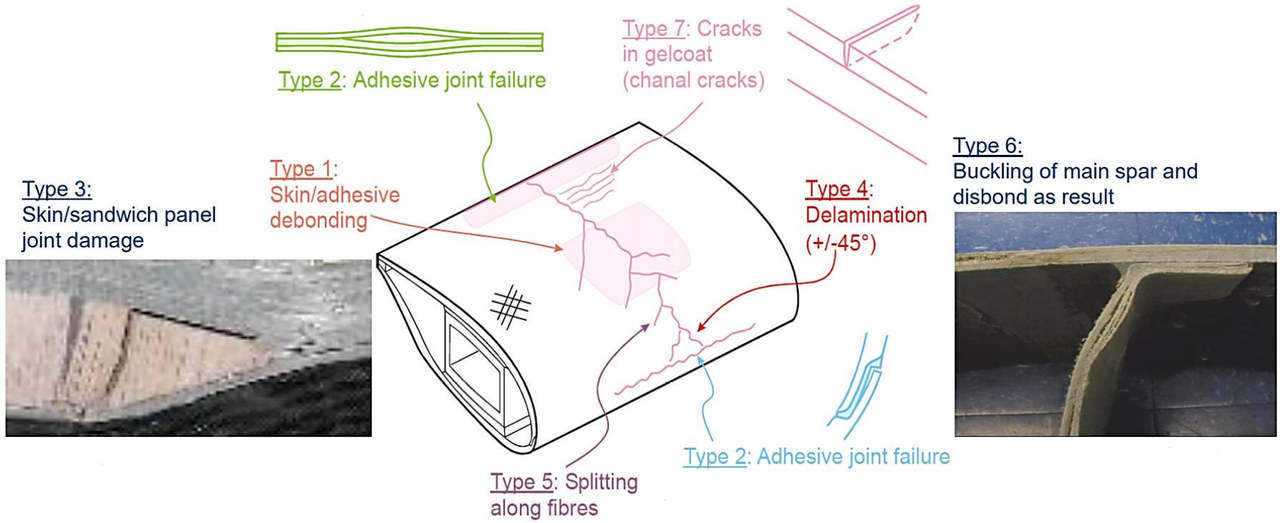
3800 blades fail a year due to internal defects causing longer downtimes and high replacement costs.

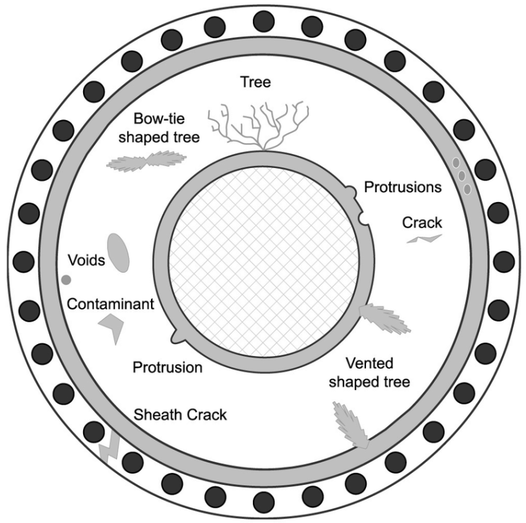
Percent of turbines with unexpected damage

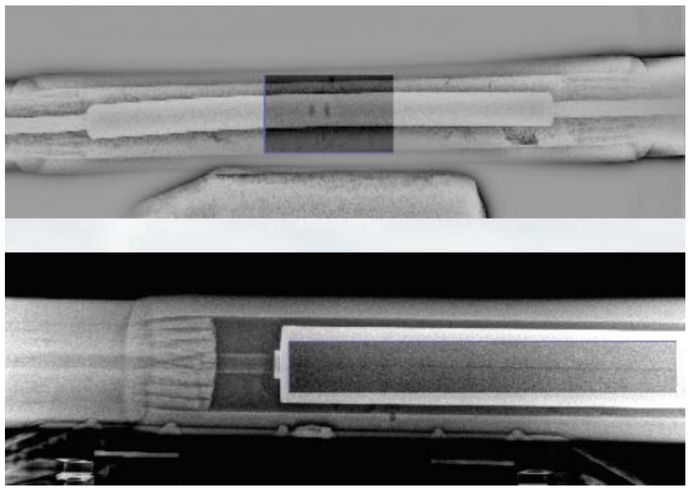


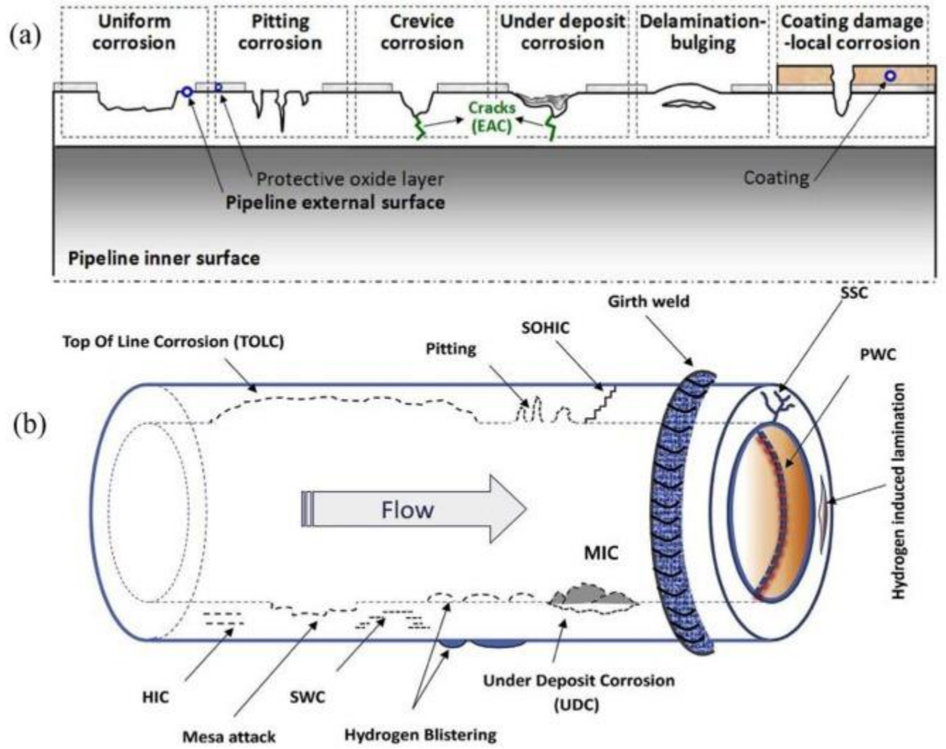
category 3	category 4	category 5
$1.5 B to repair	$2.1 B to repair	$11 B to replace blades $70M lost revenue per day

Defects we are looking into

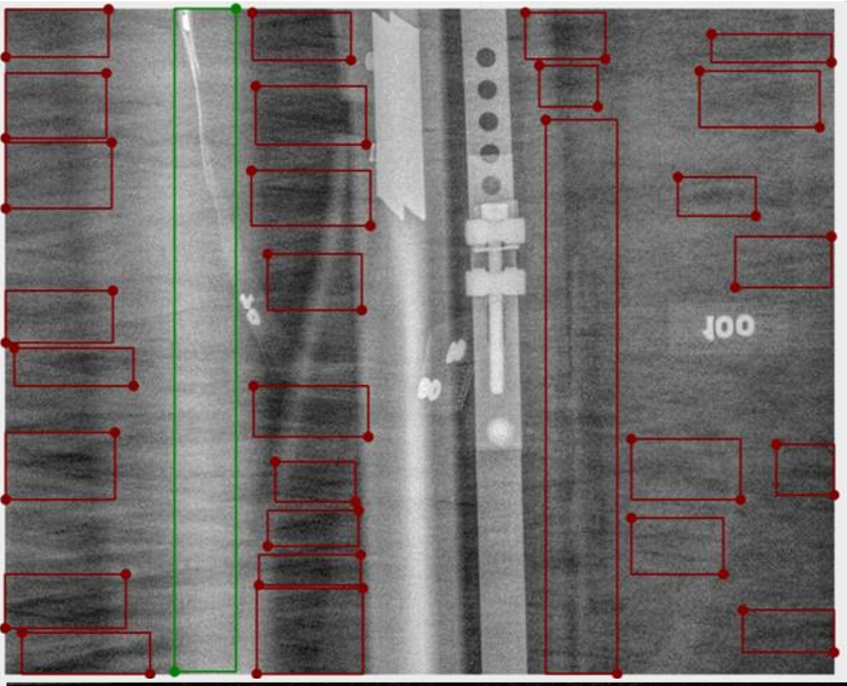


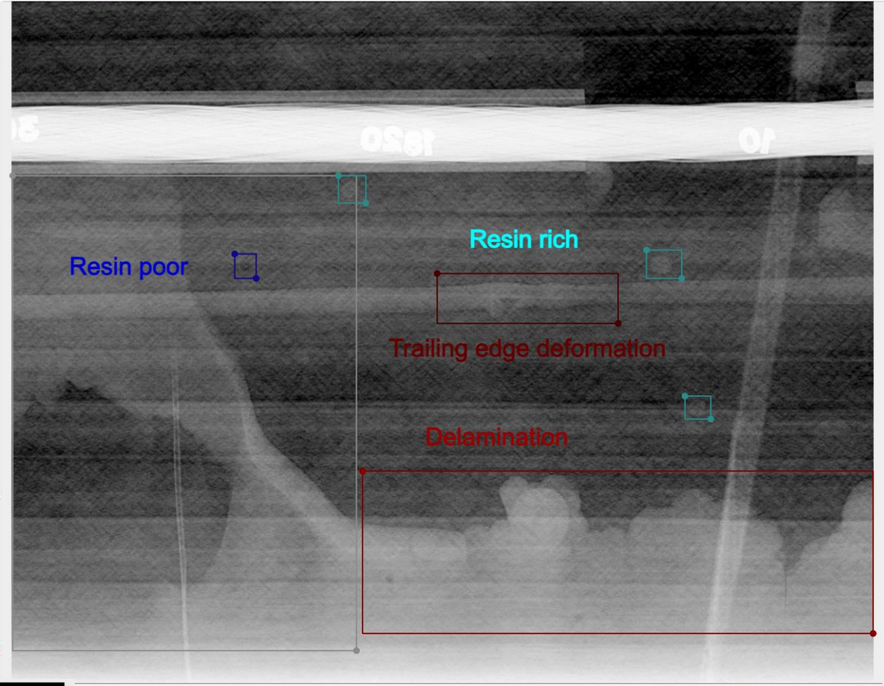


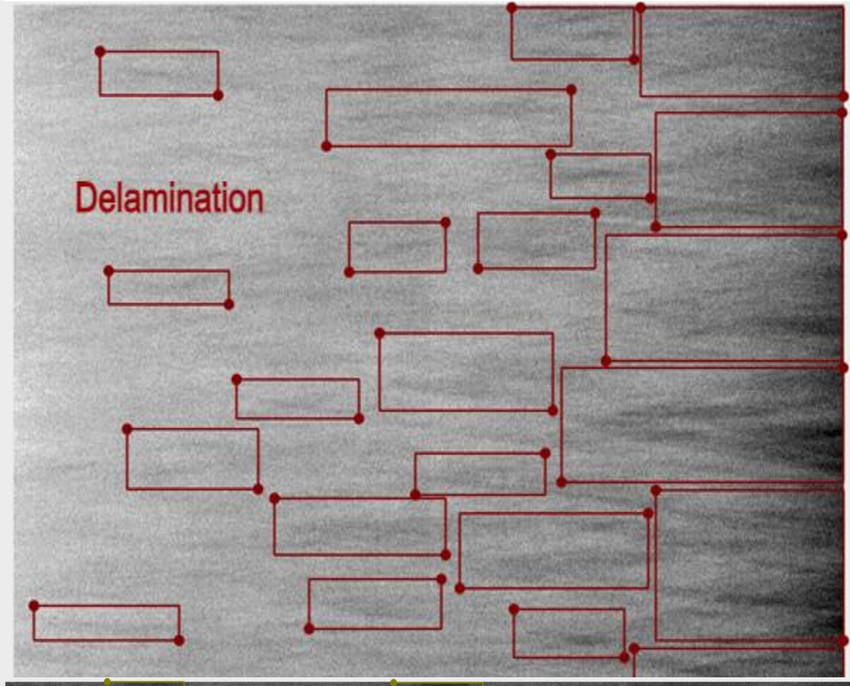


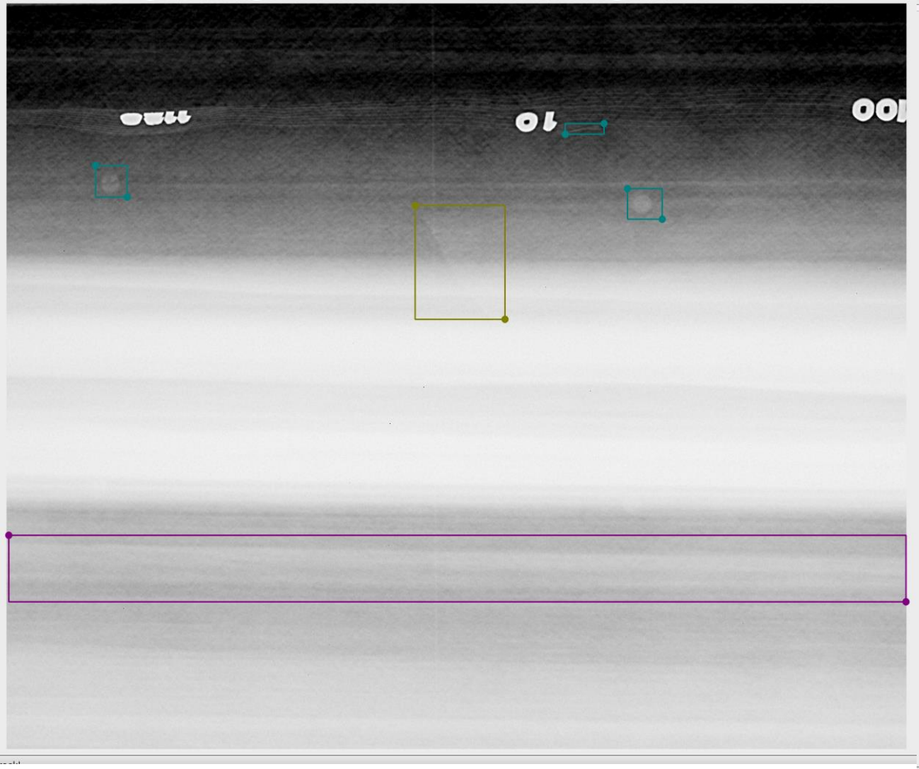


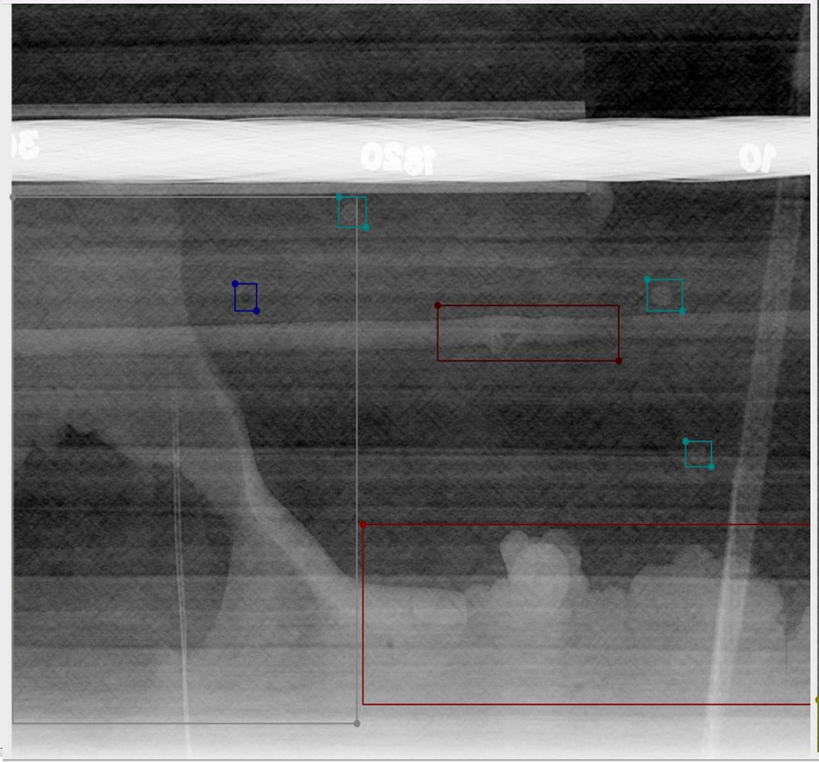
Source: Progress and trends in non-destructive testing and evaluation for wind turbine composite blade

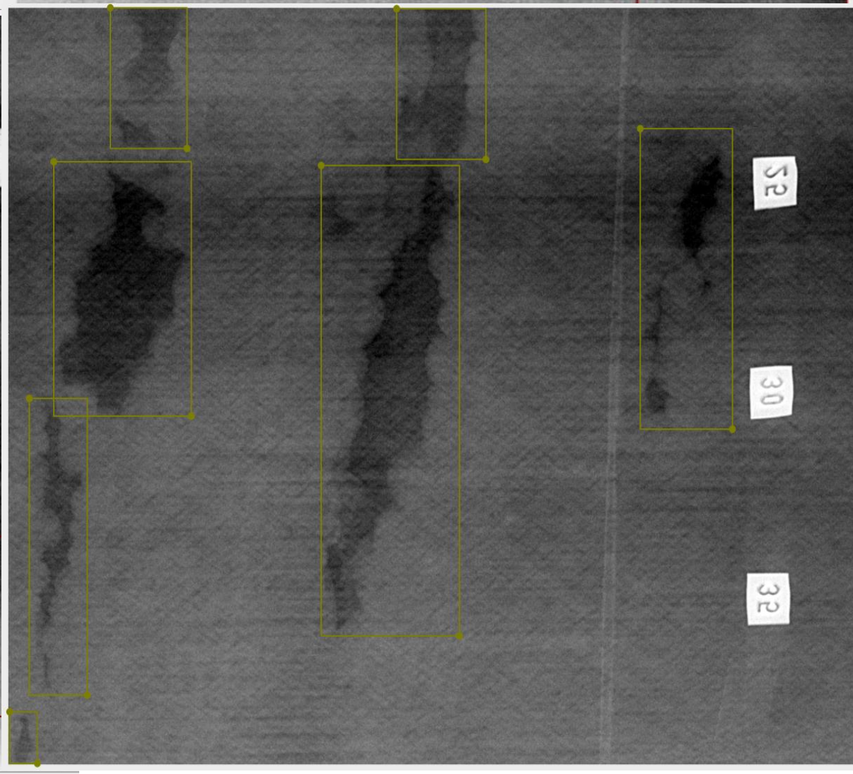



Resin poor
Resin rich
Trailing edge deformation
Delamination


Delamination






32
30
32

SPECTX

Solution

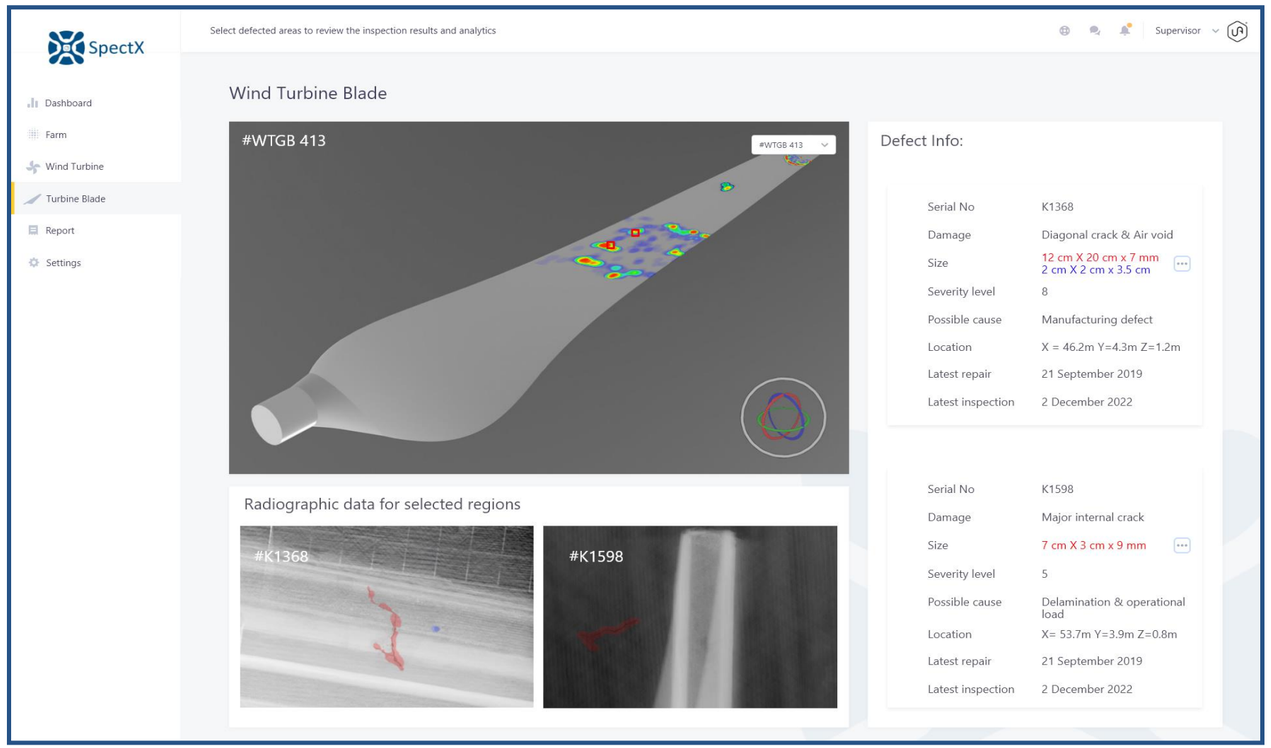
SpectX is one complete integrated system designed to detect all internal structural defects of asset infrastructure through digital radiography & completely automate the inspection process by providing a docking system.

1. Aerial positioning & synchronization
2. Alignment & motion compensation
3. Radiography control
4. Image enhancement & processing

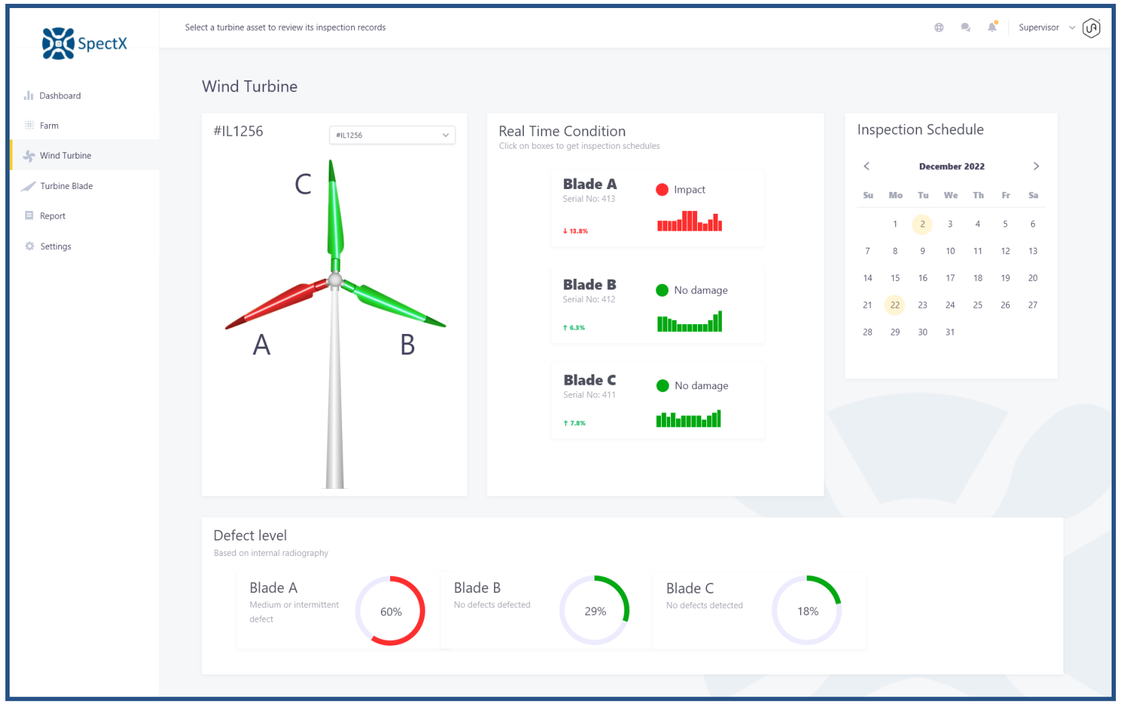
SpectX asset management portal

- **Cloud service** for asset owners or operators
- Effective **predictive maintenance**

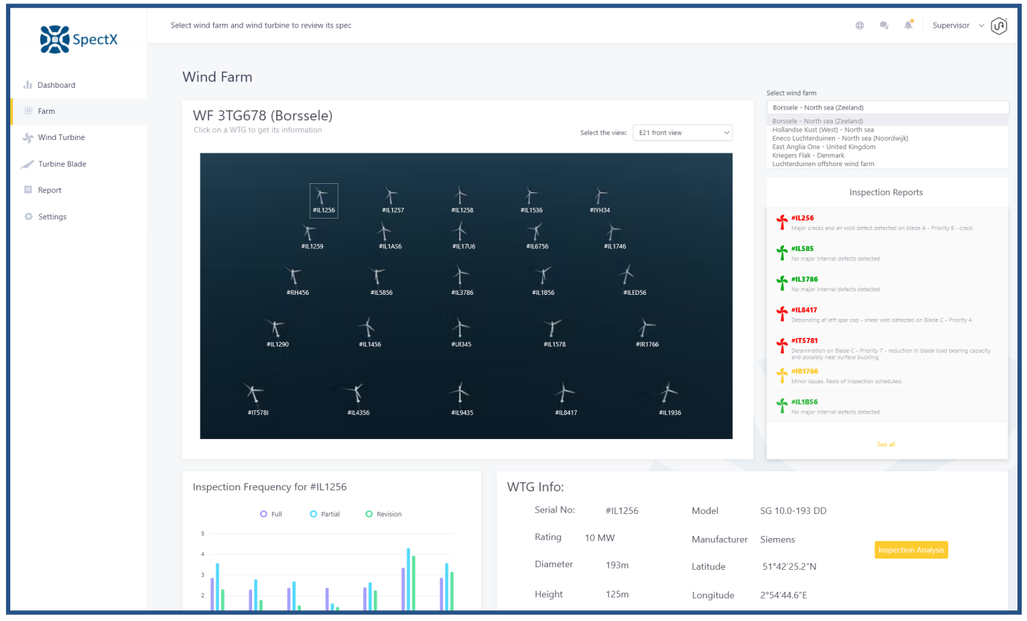
1. Blade view (damage severity analysis)



2. Turbine view



3. Windfarm view



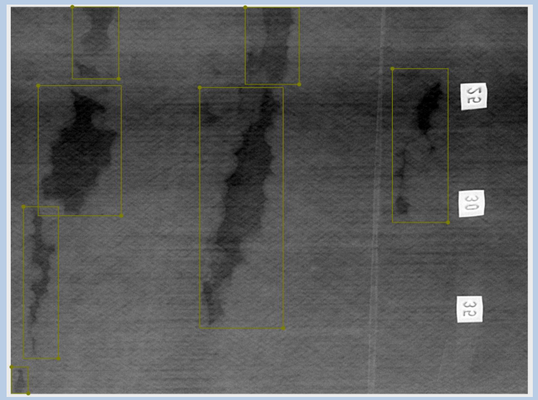
Dual-drone aerial radiography system

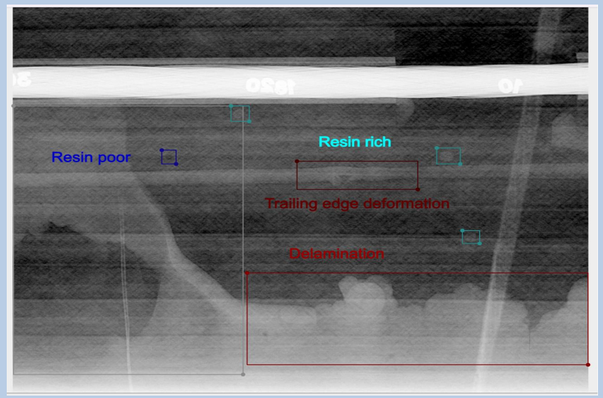
Technical Challenges

Heavy payload

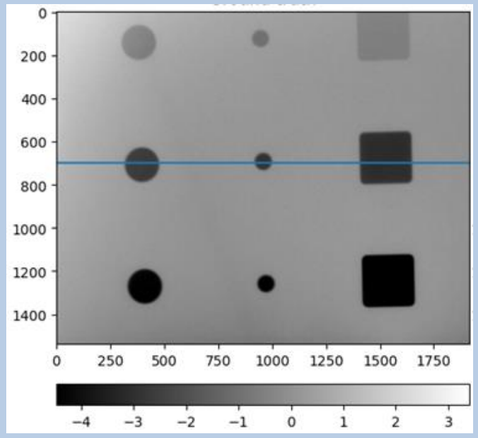
- 6 kg X-ray source
- Stabilization mechanism
- Flight time

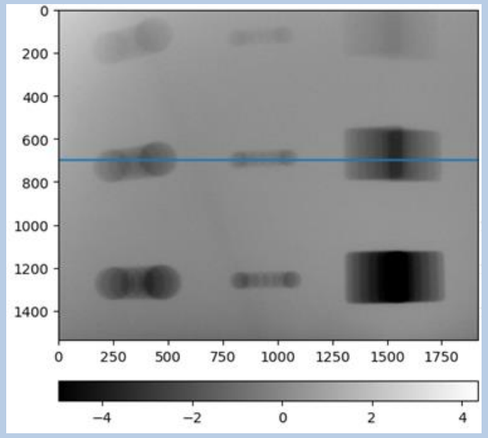
Automatic defect detection





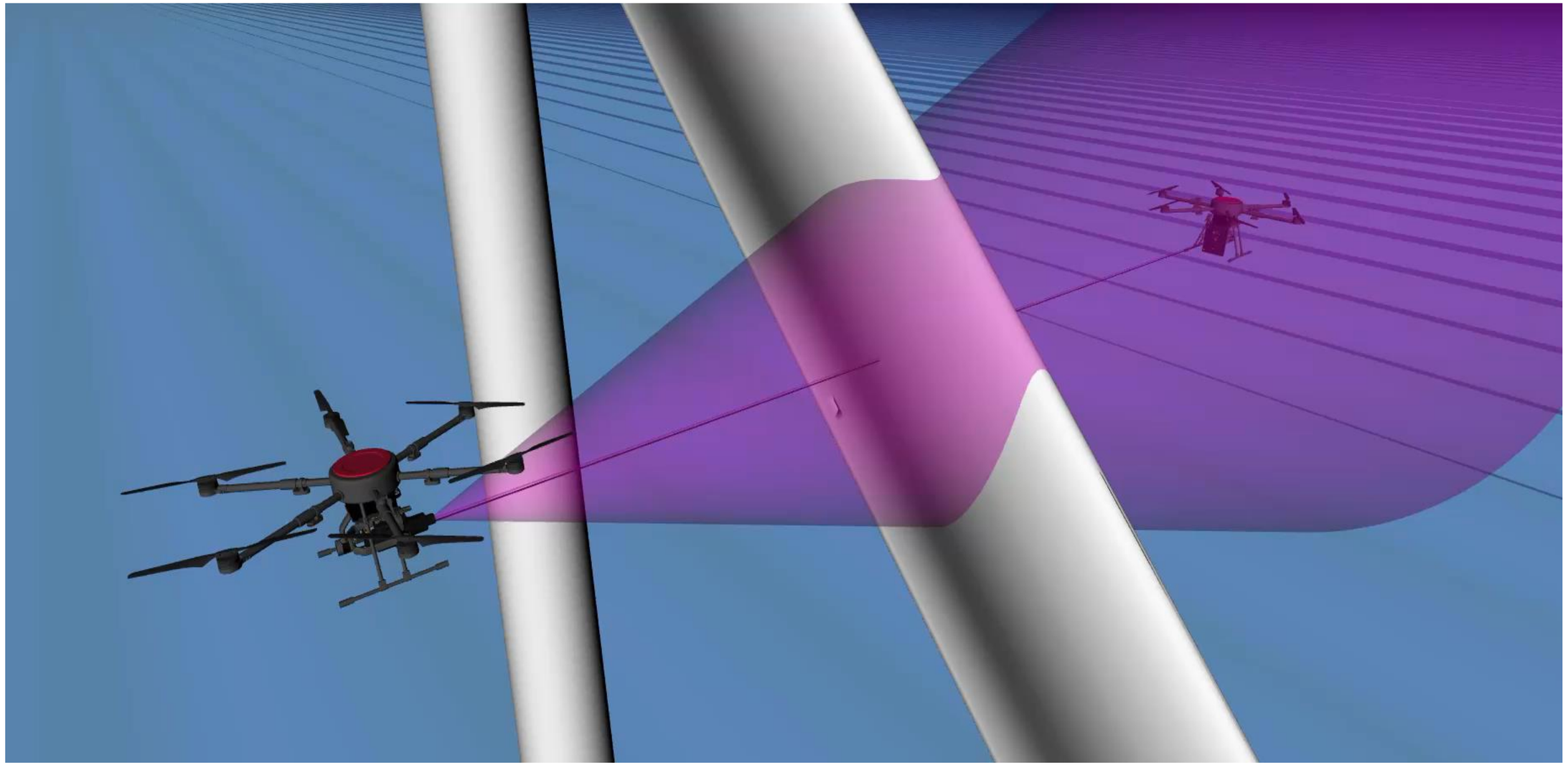
Motion blur





Alignment of X-ray source and detector

Gimbal alignment



Realization

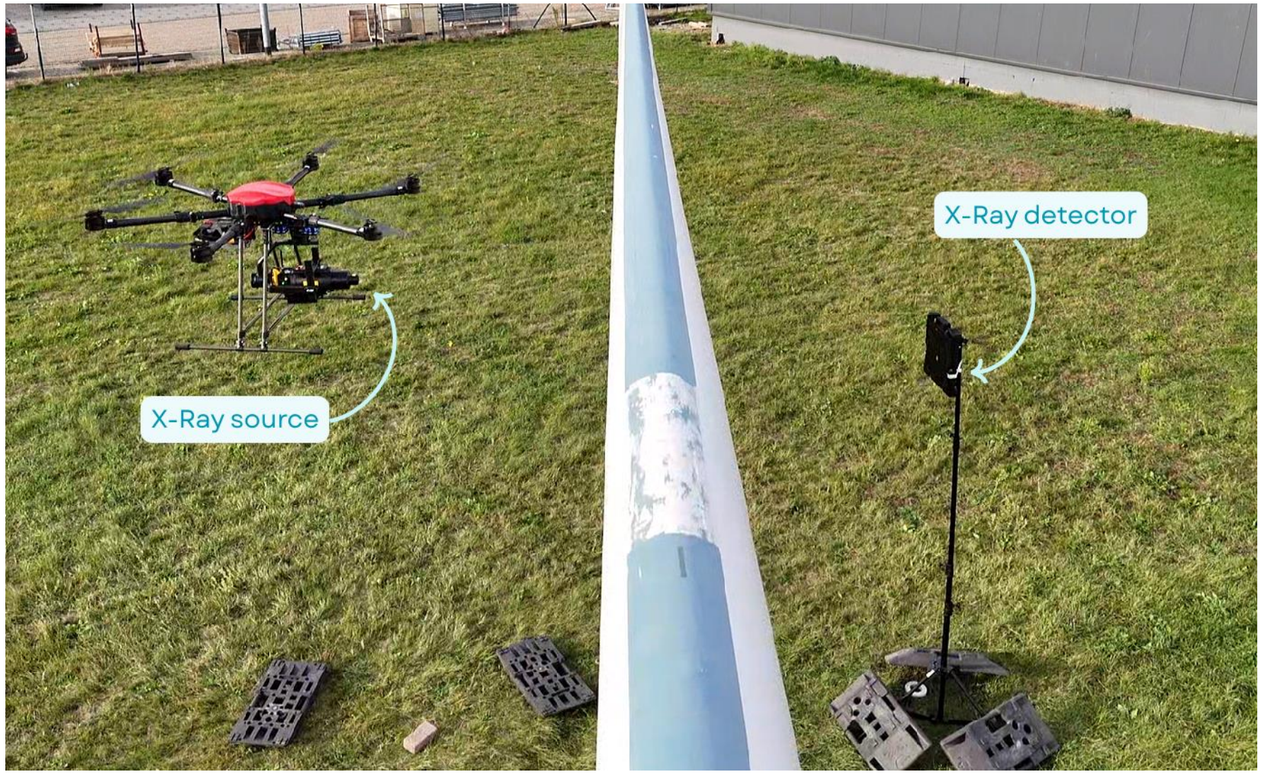
Proof of concept

Proof of concept

First X-Ray images collected in-flight

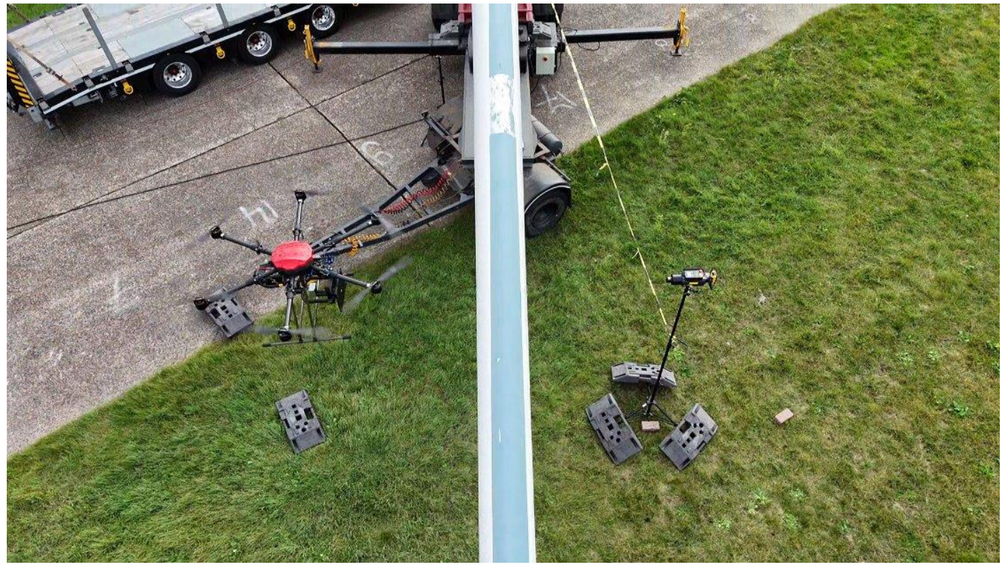
5th November

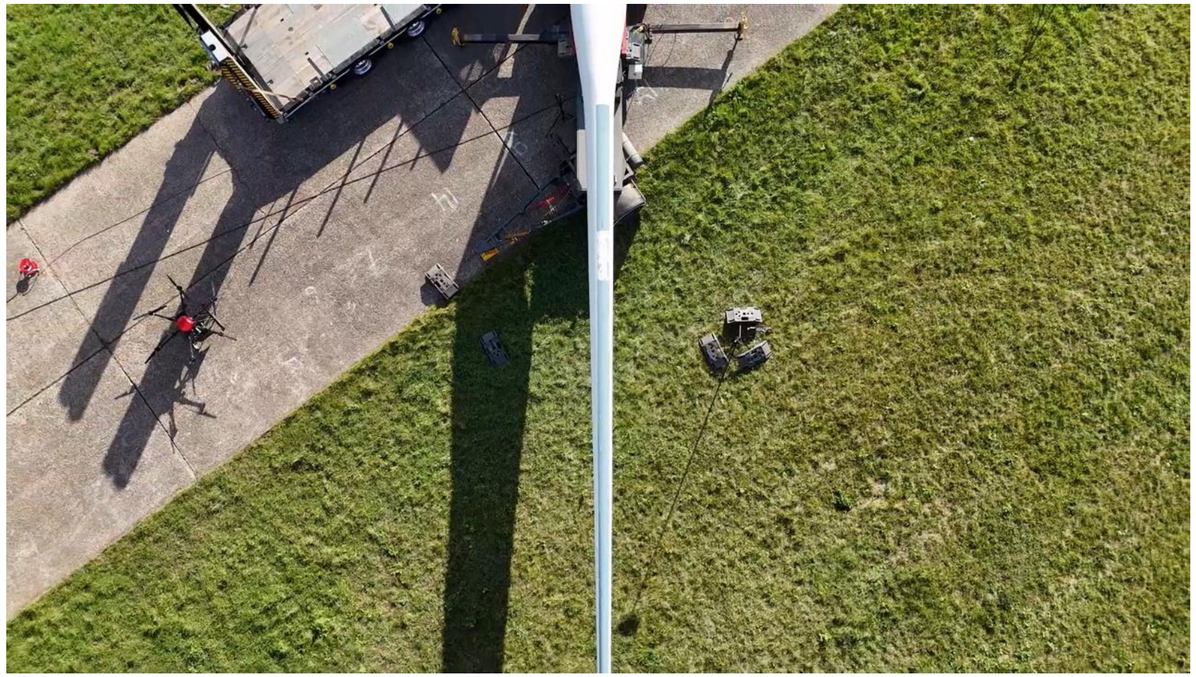
Vlissingen, de KAAP innovationpoint



Proof of concept

Test 1: Static source, Flight with detector



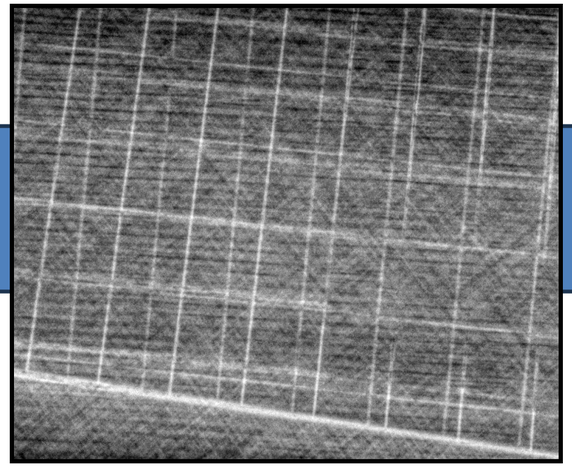


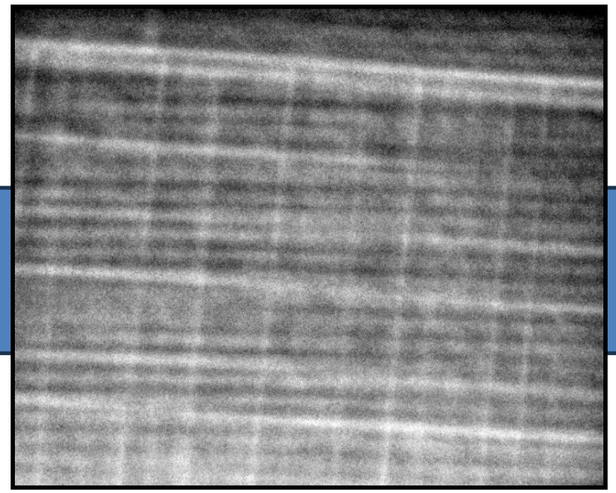
Proof of concept

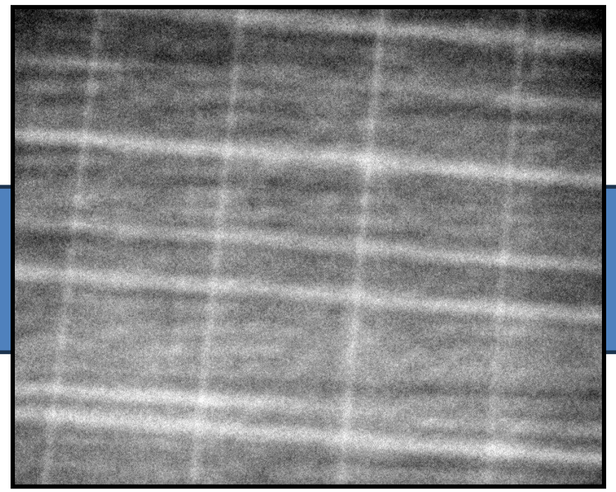
Test 2: Static detector, Flight with source

Proof of concept

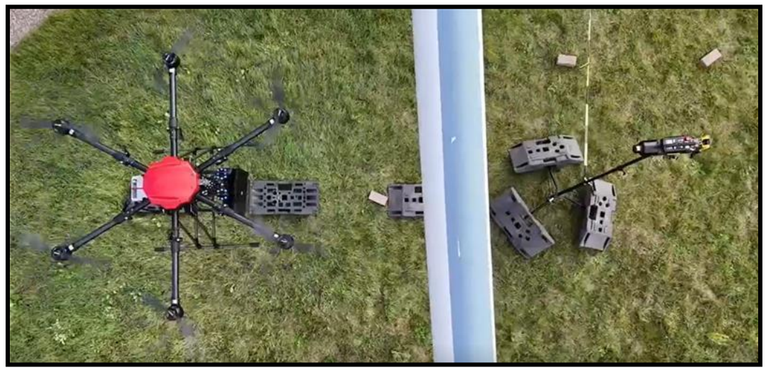
Static X-Ray image
of wind turbine blade



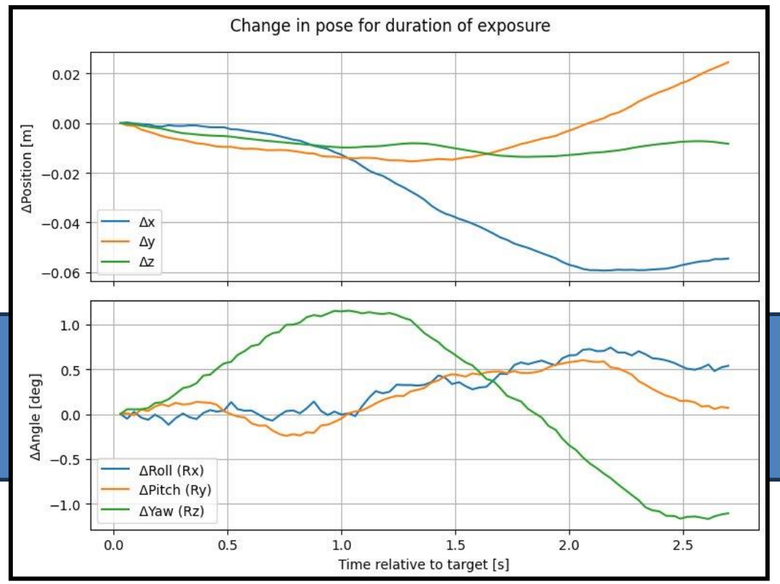




X-Ray images of wind turbine blade
taken with one drone

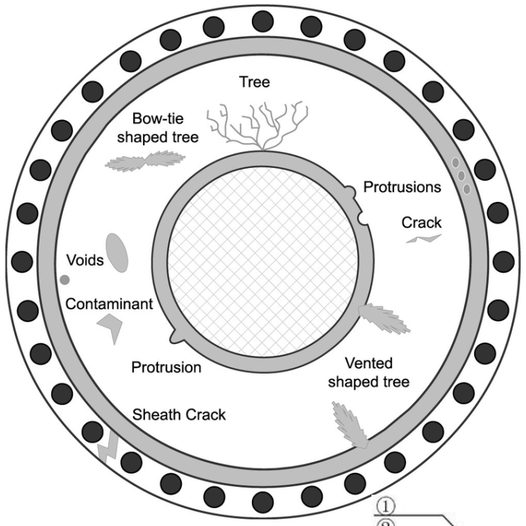


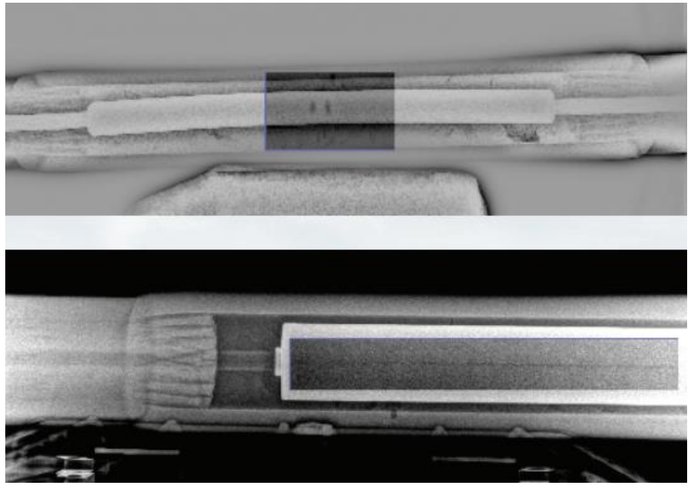
Leveraging motion data
for deblurring

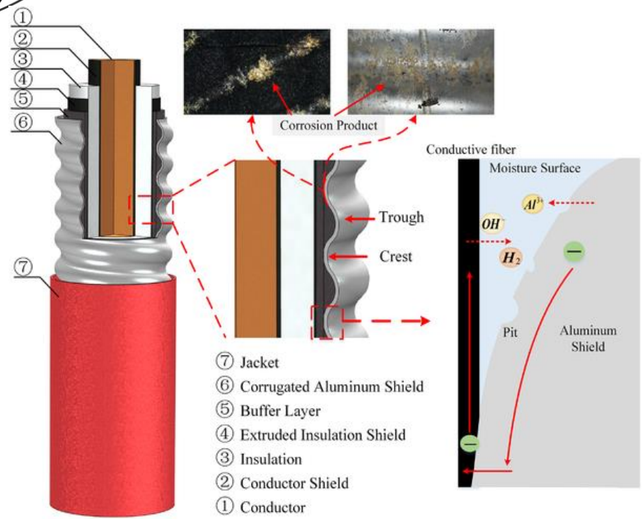


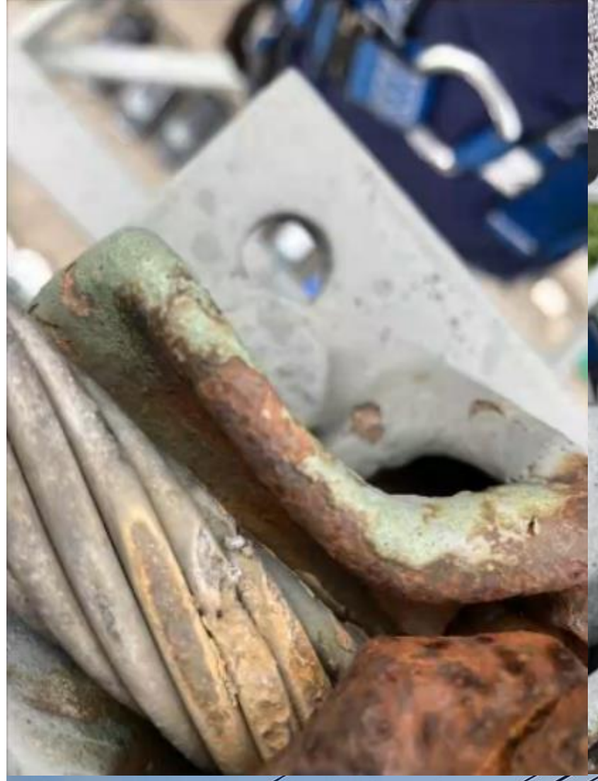
Gimbal alignment tests

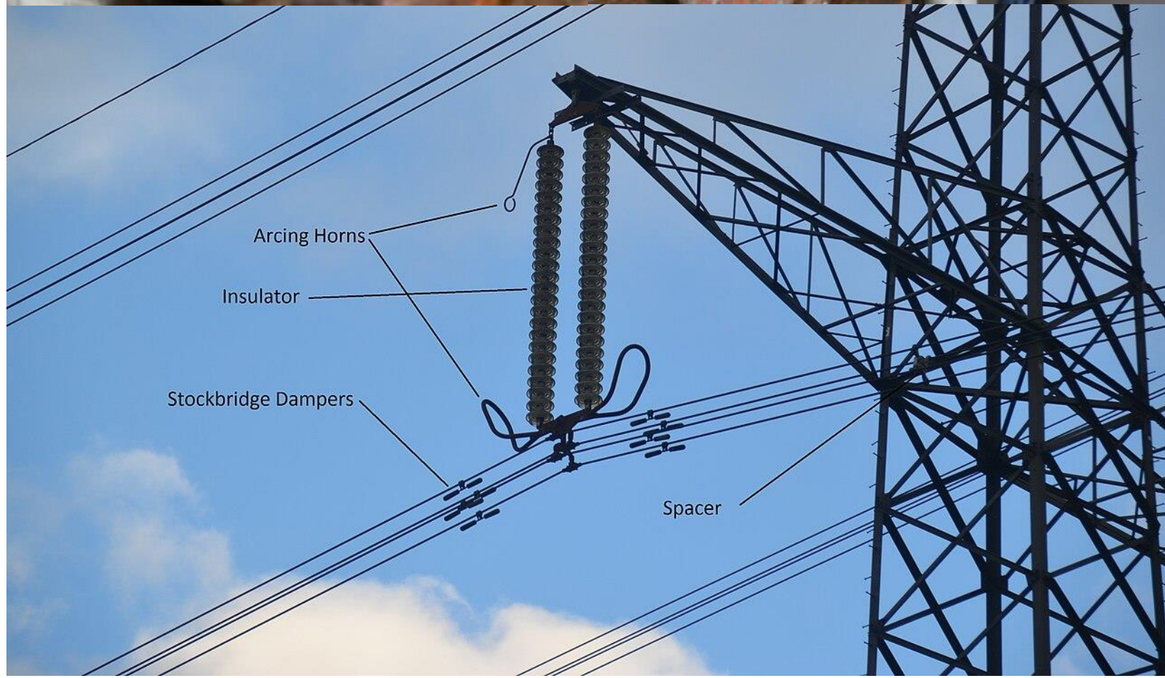
Problems within the Power line Industry





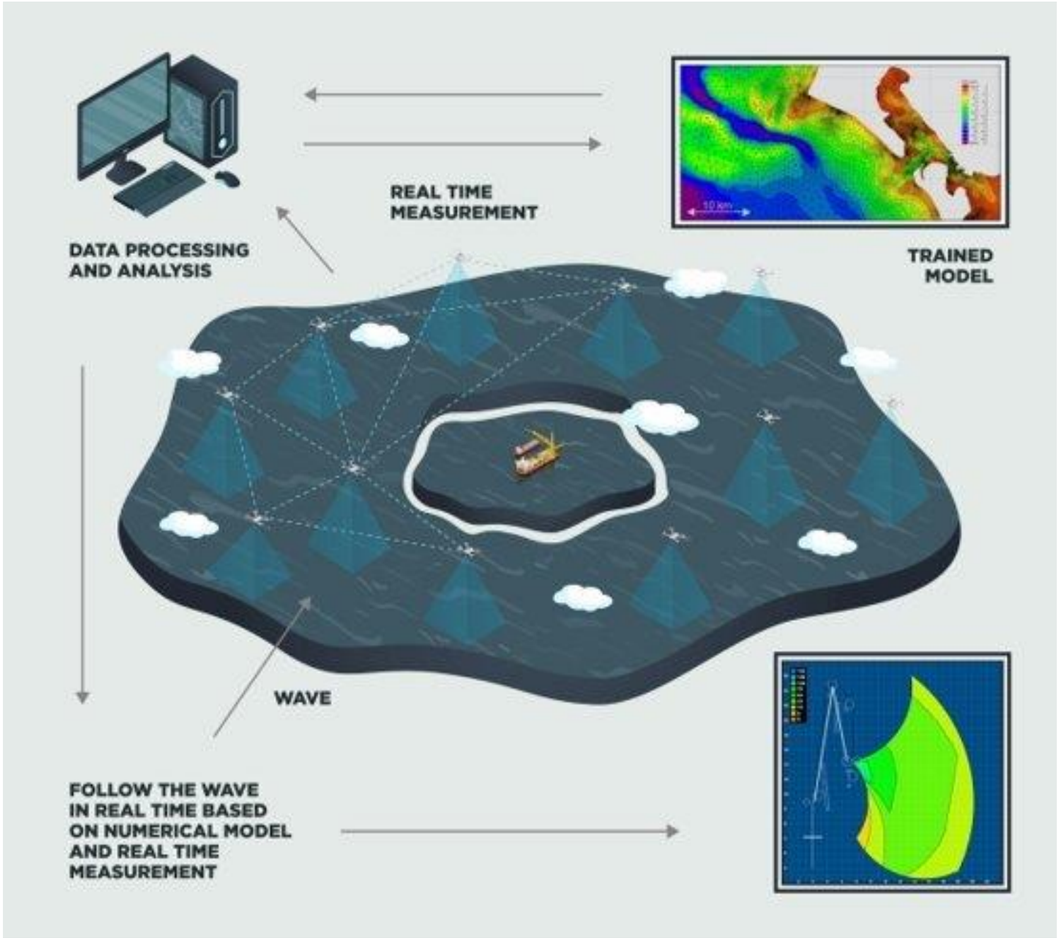






Use case: Power Grid Lines

Drones for offshore monitoring: Aquafind



Questions?

Stay tuned for takeoff!

LinkedIn